

UNPUBLISHED PRELIMINARY DATA

West Virginia University

Reaction of Sn(II) and Sn(IV) in Aqueous Solution

Progress Report - March 1, 1965

NASA Research Grant No0-533

Submitted by Arlene D. Paul

I. Summary of experiments.

- A. The reaction has been studied qualitatively in the presence of Cl^- , Br^- , F^- , SO_4^{2-} and ClO_4^- ions and in mixtures of these ions. Yellow solutions have been obtained in all cases except when F^- was present.
- B. Methods for preparing the brown solid from perchlorate solutions were investigated. The most convenient method appears to be by careful oxidation of $\text{Sn}(\text{ClO}_4)_2$ with H_2O_2 . The properties of the brown solid have been studied qualitatively. It appears to be quite unstable, reverting to SnO_2 upon drying and upon exposure to air. It is very soluble in water and methanol, but insoluble in most other common organic solvents.
- C. The chloride solutions are being studied spectrophotometrically by the method of continuous variations. In 0.36 M HCl, it appears that the yellow species contains Sn(IV) and Sn(II) in the ratio of 4:1.

- II. Evaluation of findings: The results to date support the original postulate that the reaction may involve Sn(II)-Sn(IV) hydrolysis polymers, where the Sn(II) and Sn(IV) are joined by hydroxo or oxo bridges.

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III. Research to be conducted during the balance of the period of the grant: The experimental work was begun about September 15, 1964, by Miss Katherine Robbins, a first year graduate student in chemistry, and will continue through the summer of 1965. Since the entire project is exploratory it is doubtful if any of its phases can be completed within the lifetime of the grant. However, it is hoped that considerable progress can be made during the summer, when both the graduate student and her supervisor will have more time. The following experiments will be conducted with the objective of determining what physico-chemical methods are best suited for study of the system.

- A. Continued spectrophotometric studies of the effect of acidity on the reaction in chloride solution.
- B. Begin the ion exchange studies outlined in the original proposal.
- C. Additional study of the properties of the brown solid by various physical methods.

IV. Plans for publication: It is doubtful if anything can be published for 2 or 3 years, although perhaps preliminary reports can be presented at scientific meetings.

V. Possibility for expansion of project into a major research effort: This is quite likely, but it is not possible to make a definite statement at this time.

VI. Expenditures to date are approximately \$1000.